CLAIMS:

1. A method for downlink beamforming in a frequency-division-duplex wireless communications system comprising a base station with an antenna array and terminals that are physically remote from said base station, the method comprising the steps of:

receiving at said base station antenna array combinations of arriving uplink signals from said plurality of remote terminals,

estimating an uplink beamforming weight vector for each of said terminals from said combinations of arriving uplink signal;

identifying uplink nulls and an uplink main beam position from said uplink beamforming weight vector;

transforming each of said uplink nulls to form a corresponding downlink null; generating a downlink beamforming weight vector from all downlink nulls; and

transmitting a set of information signals from said base station antenna array according to said downlink beamforming weights.

2. The method of Claim 1, wherein the transforming step comprises the substeps of:

categorising each of said uplink nulls as either bad uplink nulls or good uplink nulls;

reassigning all bad uplink nulls to form corrected uplink nulls; and

forming downlink nulls by scaling the phase of both said good uplink nulls and corrected uplink nulls according to a factor that is related to the ratio of the downlink operating frequency to the uplink operating frequency.

3. The method of Claim 2, wherein within the categorising step the said uplink null $\theta_{u,k}$ is marked bad if it satisfies the existence-of-pseudo-null condition $|\theta_{u,k}| \geq |\theta_0|$, where $\theta_0 = \arcsin(\frac{\lambda_d}{z} - 1)$ is the null wrapping DOA threshold, λ_d being the downlink wavelength and Z the antenna spacing, and its corresponding pseudo null in the downlink beam pattern lies within a specified proximity of said main beam position of the uplink beam method.

4. The method of Claim 2, wherein the reassigning step resets each of said bad nulls to be within the interval $[-|\theta_0|, |\theta_0|]$.

5. The method of Claim 2, wherein the reassigning step resets each of said bad nulls to 0°.

6. The method of Claim 2, wherein the reassigning step further includes the substeps of identifying substantially the DOAs of all terminals and resetting all bad nulls to the said set of DOAs corresponding to the highest data rate terminals and/or large numbers of closely located interfering terminals.

7. A method for downlink beamforming in a frequency-division-duplex wireless communications system comprising a base station with an antenna array and terminals that are physically remote from said base station, the method comprising the steps of:

selecting an antenna spacing for antennas in the array;

receiving at said base station antenna array combinations of arriving signals from said plurality of remote terminals, each signal having a beam pattern incorporating a main beam and one or more nulls;

identifying an uplink beamforming weight for a signal;

generating a downlink beamforming weight based on the signal's uplink beamforming weight; and

transmitting downlink signals using downlink beamforming weights.

8. A method according to Claim 7, wherein the antenna spacing for the antenna array is selected to be less than or equal to half of the downlink wavelength, thereby avoiding the null wrapping phenomenon.

9. A method according to Claim 7, wherein the antenna spacing for the antenna array is selected to be greater than half of the downlink wavelength and less than or equal to half the uplink wavelength, thereby alleviating the null-wrapping phenomenon.

10. A method according to Claim 7, wherein the antenna spacing for the antenna array is selected to be equal to a quarter of the sum of the downlink wavelength and the uplink wavelength.

11. A method for downlink beamforming in a frequency-division-duplex wireless communications system comprising a base station with an antenna array defining a communication cell and terminals that are physically remote from said base station, the method comprising the steps of:

dividing the communication cell into a plurality of sectors;

identifying uplink nulls which would yield pseudo nulls in a sector;

constraining use of the system to those terminals in a sector in which no pseudo nulls will be generated;

receiving at said base station antenna array combinations of arriving signals from said plurality of remote terminals, each signal having a beam pattern incorporating a main beam and one or more nulls;

identifying an uplink beamforming weight for a signal;

generating a downlink beamforming weight based on the signal's uplink beamforming weight; and

transmitting downlink signals using downlink beamforming weights.

12. A base station for a wireless communications system, the base station comprising:

an uplink receiver antenna array for receiving arriving signals from a plurality of remote terminals on respective uplink channels;

a downlink weight generator operable to generate downlink weights based on a signal's uplink beamforming weight;

a downlink transmit antenna array to transmit signals to the remote terminals in accordance with the generated downlink weights; and

means to move at least one of the downlink nulls to a safe position.

13. A base station for a wireless communications system, the base station comprising:

an uplink receiver antenna array for receiving arriving signals from a plurality of remote terminals on respective uplink channels, the array having a predetermined antenna spacing to alleviate null-wrapping;

a downlink weight generator operable to generate downlink weights based on a signal's uplink beamforming weight; and

a downlink transmit antenna array to transmit signals to the remote terminals in accordance with the generated downlink weights.

14. A base station for a wireless communications system, the base station comprising:

an uplink receiver antenna array for receiving arriving signals from a plurality of remote terminals on respective uplink channels;

a downlink weight generator operable to generate downlink weights based on a signal's uplink beamforming weight;

a downlink transmit antenna array to transmit signals to the remote terminals in accordance with the generated downlink weights, the transmission cell of the antenna array being divided into a plurality of sectors;

means to identify uplink nulls which would yield pseudo nulls in a sector; and

means to constrain use of the system to those terminals in a sector in which no pseudo nulls will be generated.

15. A communication system incorporating a base station according to Claim 12 and a plurality of remote terminals.

16. A communication system incorporating a base station according to Claim 13 and a plurality of remote terminals.

17. A communication system incorporating a base station according to Claim 14 and a plurality of remote terminals.